

CLAIMS

What is claimed is

1. An aircraft comprising:

5 a boomerang-shaped front wing curving gibbously to a front of the aircraft, which has a leading edge, a trailing edge and a first and second airfoil tips;

a boomerang-shaped rear wing curving gibbously to a back of the aircraft, which has a leading edge, a trailing edge and a third and forth airfoil
10 tips;

a first wing box connecting the first airfoil tip of the front wing and the third airfoil tip of the rear wing; and

a second wing box connecting the second airfoil tip of the front wing and the fourth airfoil tip of the rear wing,

15 wherein the trailing edge of the front wing, the leading edge of the rear wing, an internal surface of the first wing box and an internal surface of the second wing box form a center opening.

2. The aircraft according to claim 1 wherein the center opening has a substantially elliptical shape.

20 3. The aircraft according to claim 1 wherein the center opening has a polygonal shape.

4. The aircraft according to claim 1 wherein the center opening has a substantially rhombus shape.

5. The aircraft according to claim 1 wherein the center opening has a shape made of a combination of any one of elliptical, polygonal, and rhombus shape.

6. The aircraft according to any one of claim 1 to claim 5 further comprising propeller engines in the center opening.

5 7. The aircraft according to any one of claim 1 to claim 5, further comprising any one of jet engines and ducted fan-type engines.

8. The aircraft according to any one of claim 6 to claim 7, further comprising a possibility to control the speed of each engine independently.

9. The aircraft according to any one of claim 1 to claim 8 wherein at least a
10 chord line of the front wing is slightly inclined relative to a horizontal surface so that the leading edge of the front wing is located one of higher and lower than the trailing edge relative to the horizontal surface.

10. The aircraft according to any one of claim 1 to claim 8 wherein at least a
15 chord line of the rear wing is slightly inclined relative to a horizontal surface so that the leading edge of the rear wing is located one of higher and lower than the trailing edge relative to the horizontal surface.

11. The aircraft according to any one of claim 1 to claim 10 wherein angles made by the chord lines of the front wing and the chord lines of the rear wing differ from one chord line to another along a wingspan direction.

20 12. The aircraft according to claim 11 wherein the angle of inclination of the rear wing satisfies:

$$Y=0.95Y_0\sim 1.05Y_0 \text{ and}$$

$$Y_0=-8.5*10^{-8}X^4+1.70*10^{-5}X^3-1.54*10^{-3}X^2+6.9*10^{-2}X, \text{ where } X \text{ is a ratio (\%)}$$

of a length from an airfoil tip to another airfoil tip of the rear wing relative the wingspan direction and Y is an angle (degree) at a point where the ratio is X.

13. The aircraft according to any one of claim 6 to claim 12 wherein the engines include a first engine and a second engine which are supported by a first pylon and a second pylon jutting from the first and the second wing boxes respectively,

wherein fuel tanks are provided inside of each of the first and the second wing boxes, and

wherein fuel is provided to the first and second engines from the fuel tanks in the wing boxes through fuel pipes provided in the first and second pylons.

14. The aircraft according to claim 13 wherein the first and the second engines are rotatably supported by the first and the second pylons to rotate about 90 degrees between a first position wherein rotation axes of propellers are approximately in parallel to a horizontal surface and a second position wherein the rotation axes of the propellers are approximately perpendicular to the horizontal surface.

15. The aircraft according to any one of claim 13 to claim 14 further comprising an elevator arranged within an area surrounded by extended lines of major axes, at the propellers' axes of rotation, of the engines on the trailing edge of the rear wing.

16. The aircraft according to any one of claim 6 to claim 15 further comprising two pairs of front ailerons on the front wing and two pairs of rear ailerons, both the front and the rear ailerons are controlled one of synchronously and independently.

17. The aircraft according to any one of claim 6 to claim 16 further comprising vertical fins at one of directly behind the engines relative to a horizontal direction on the rear wing, and on the top surface of the first and second wing boxes.

18. The aircraft according to claim 17 wherein the vertical fins include
5 rudders.

19. The aircraft according to any one of claim 6 to claim 16 further comprising drag rudders on the rear wing.

20. The aircraft according to any one of claim 1 to claim 19 wherein a center of gravity of the aircraft is located anterior to the center of the top view of the
10 aircraft.

21. The aircraft according to any one of claim 1 to claim 20 wherein the boomerang-shaped front wing has a different wing area from the boomerang-shaped rear wing.

22. The aircraft according to any one of claim 1 to claim 21 wherein at least
15 one several vertical takeoff and landing (VTOL) rotor is provided in the center opening.

23. The aircraft according to any one of claim 1 to claim 22 wherein a central body is provided in the center opening, attached to one of the front and the rear wings and the pylons only and is located one of within and below a horizontal
20 plane defined by the front and the rear boomerang-shaped wings.

24. The aircraft according to any one of claim 1 to claim 23 wherein jet vents are provided on a periphery of the aircraft to control the aircraft while hovering.